



Agilent B1542A

Ten Nanosecond Pulsed IV Parametric Test Solution

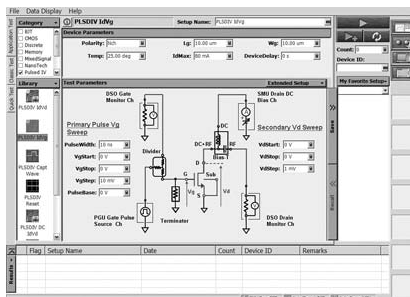
Proven, accurate high-k/SOI characterization by 10 nsec pulse width

Technical Overview

- Agilent B1500A – Semiconductor Device Analyzer
- Agilent 4156B/4156C – Precision Semiconductor Parameter Analyzer
- Agilent 4155B/4155C – Semiconductor Parameter Analyzer
- Agilent E5260A/E5270B – 8 slot Measurement Mainframe

Overview

State of the art semiconductor processes continue to meet market demands requiring smaller lithography, faster switching times, and lower power consumption. Accompanying the transition to the 45 nanometer node is the use of high-k gate dielectrics and silicon-on-insulator (SOI) transistors. The Agilent B1500A is well-positioned to act as the focal point for the parametric characterization of these devices in laboratory environments. Already possessing superb dc measurement performance, the B1500A with EasyEXPERT software now supports a pulsed IV measurement solution utilizing an Agilent 81110A pulse pattern generator and Agilent DSO90604A/90404A/90254A and DSO80000B/54850 series scopes that can characterize MOSFETs with an unprecedented gate pulse width of 10 nanoseconds.



Application Library on the B1500A
EasyEXPERT

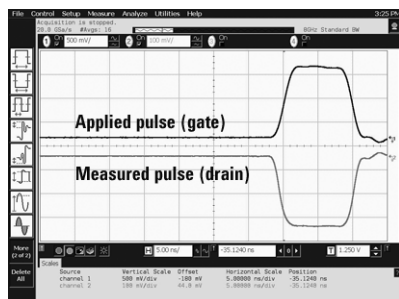


Agilent Technologies

Features

10 nanosecond gate pulse widths

This solution provides a 10 ns gate pulse width with 2 ns rise and fall times. It produces a clean rectangular waveform with minimal overshoot and undershoot.



Applied 10 nsec gate pulse and measured drain current

1 μ A current measurement resolution

This solution gives 1 μ A current measurement resolution using a 10 ns pulse width, enabling more precise characterization of high-k and SOI devices.

Feedback loop enables accurate ID-VD and ID-VG measurement

This solution monitors the actual MOSFET drain voltage and automatically corrects the applied drain voltage to insure that the actual drain voltage (on the transistor side of the load resistor) is correct for each measurement point. This is supported for both ID-VD and ID-VG measurements.

Easy switching between dc and pulsed measurements

A dc to pulsed IV switching option is available to enable you to toggle between dc measurements and pulsed IV measurements without having to change any cables. This makes it easy to correlate dc measurements with pulsed measurements, and it also permits the automation of this process.

Support 4155/4156 (B, C series)

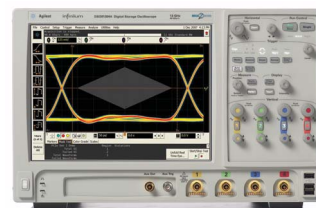
The application supports not only the B1500A but also Agilent 4155/4156 (B, C series), Agilent E5260A, Agilent E5270B. If you already have these instruments, you can utilize them for the Pulsed IV solution with Desktop EasyEXPERT software.

Can reuse existing instruments to lower costs

If you already have the Agilent pulse generator and oscilloscope you can use them with the pulsed IV solution. This reduces the total cost of the solution.

Easy setup using Agilent EasyEXPERT software

Agilent EasyEXPERT software, which is included on the B1500A and is also available in a desktop version, makes it easy for even neophyte users to make pulsed IV measurements. After selecting a pulsed IV application test, an intuitive GUI-based test setup window displays a complete schematic of the test equipment, making it easy to connect the components correctly. Following a straightforward “fill-in-the-blanks” process, the user clicks the “measure” button and begins making pulsed IV measurements. A graph and list of the data are generated automatically, and the user can export the data into a variety of data-analysis tools such as Microsoft Excel.



The Pulsed IV solution supports 4155/4156 (B, C series) through Desktop EasyEXPERT

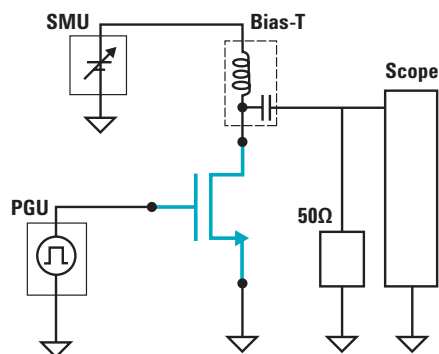
Typical technical information

Gate pulse width:	10 ns to 1 μ s
Gate pulse voltage :	–4.5 V to 4.5 V
Drain pulse measurement current:	Max. 80 mA
Drain pulse measurement current resolution:	1 μ A
Drain voltage range:	–10 V to 10 V

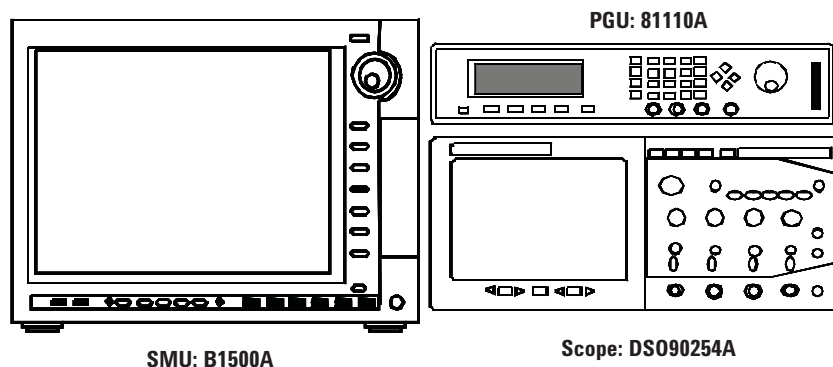
Block diagram for ultra-short pulsed IV

This block diagram shows a basic overview of the pulsed IV measurement. The drain voltage (or calculated current going into the drain) of the MOSFET is measured by the oscilloscope while an ultra-short pulse is applied to the gate by the PGU. The benefits of this for each technology type are:

1. For SOI transistors, the short duty cycle reduces self-heating effects that adversely impact the measurement results.
2. For high-k gate dielectric transistors, the short duty cycle reduces the incidence of electron trapping that distorts measurement results.



System configuration



Operation environment

Supported instrument

Agilent B1500A	Semiconductor Device Analyzer
Agilent 4156B/4156C	Precision Semiconductor Parameter Analyzer
Agilent 4155B/4155C	Semiconductor Parameter Analyzer
Agilent E5270B	8 slot Precision Measurement Mainframe
Agilent E5260A	8 slot High Speed Measurement Mainframe
Agilent 8110A/81101A/81110A	Pulse Pattern Generator
Agilent DS090604A/90404A/90254A/DS080000B series/54850 series/DS08000A series/MS08000A series	Infiniium Oscilloscope

Product/option	Description
B1542A	Pulsed IV Package for B1500/EasyEXPERT
B1542A-001	Pulsed IV SW LTU Media&Manual
B1542A-003	Pulsed IV Option for 4155/4156/E5270/E5260
B1542A-021	Pulsed IV Gate Cable Set
B1542A-022	Pulsed IV Drain Cable Set
B1542A-023	Pulsed IV Docking I/F
B1542A-024	Pulsed IV Switch Set
B1542A-025	Rackmount Kit for Pulse/DC Switch Units
E3333A-002	Add 81110A with 1 output channel
E3333A-015	Add DS090254A 2.5 GHz Infiniium scope



Agilent Email Updates

www.agilent.com/find/emailupdates

Get the latest information on the products and applications you select.



Agilent Direct

www.agilent.com/find/agilentdirect

Quickly choose and use your test equipment solutions with confidence.



www.agilent.com/find/open

Agilent Open simplifies the process of connecting and programming test systems to help engineers design, validate and manufacture electronic products. Agilent offers open connectivity for a broad range of system-ready instruments, open industry software, PC-standard I/O and global support, which are combined to more easily integrate test system development.



www.lxistandard.org

LXI is the LAN-based successor to GPIB, providing faster, more efficient connectivity. Agilent is a founding member of the LXI consortium.

Remove all doubt

Our repair and calibration services will get your equipment back to you, performing like new, when promised. You will get full value out of your Agilent equipment throughout its lifetime. Your equipment will be serviced by Agilent-trained technicians using the latest factory calibration procedures, automated repair diagnostics and genuine parts. You will always have the utmost confidence in your measurements.

Agilent offers a wide range of additional expert test and measurement services for your equipment, including initial start-up assistance onsite education and training, as well as design, system integration, and project management.

For more information on repair and calibration services, go to

www.agilent.com/find/removealldoubt

www.agilent.com

For more information on Agilent Technologies' products, applications or services, please contact your local Agilent office. The complete list is available at: **www.agilent.com/find/contactus**

Americas

Canada	877 894 4414
Latin America	305 269 7500
United States	800 829 4444

Asia Pacific

Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 112 929
Japan	81 426 56 7832
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Thailand	1 800 226 008

Europe & Middle East

Austria	0820 87 44 11
Belgium	32 (0) 2 404 93 40
Denmark	45 70 13 15 15
Finland	358 (0) 10 855 2100
France	0825 010 700*
	*0.125 €/minute
Germany	01805 24 6333*
	*0.14 €/minute
Ireland	1890 924 204
Israel	972 3 9288 504/544
Italy	39 02 92 60 8484
Netherlands	31 (0) 20 547 2111
Spain	34 (91) 631 3300
Sweden	0200-88 22 55
Switzerland	0800 80 53 53
United Kingdom	44 (0) 118 9276201

Other European Countries:

www.agilent.com/find/contactus

Revised: March 27, 2008

Product specifications and descriptions in this document subject to change without notice.

© Agilent Technologies, Inc. 2007, 2008

Printed in USA, June 19, 2008

5989-5262EN



Agilent Technologies